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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/449,250	11/24/1999	MI-SUEN LEE	PHA-23-859	6048

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EXAMINER	
KIM, CHONG R	
ART UNIT	**PAPER NUMBER**
2623	15

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/449,250	Applicant(s) LEE, MI-SUEN	
	Examiner Charles Kim	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may e reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, e reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will epply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce eny earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 November 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. In view of the appeal brief filed on December 29, 2003, PROSECUTION IS HEREBY REOPENED. The new grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 9, 10, 12, 18, 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Ruland, U.S. Patent No. 6,104,831 ("Ruland").

Referring to claim 1, Ruland discloses a method for detecting an object of interest in an image processing system, the method comprising the steps of:

a. generating a difference image (col. 2, lines 29-31)

b. segmenting the difference image into a plurality of regions, wherein the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more lines passing through the entire image (col. 2, lines 32-33 and figure 3)

c. identifying one or more silhouette candidates in at least a subset of the regions (col. 2, lines 33-35)

d. detecting the object of interest (intruder) based at least in part on the identified silhouettes (col. 2, lines 40-43).

Referring to claim 2, Ruland further discloses that the object of interest is a moving person (col. 2, lines 1-5 and figure 3).

Referring to claim 4, Ruland further discloses that the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more vertical lines passing through the entire image (col. 2, lines 32-33 and figure 3).

Referring to claim 9, see the rejection of at least claim 1 above. Ruland further discloses a camera (col. 4, lines 47-50).

Referring to claim 10, see the rejection of at least claim 2 above.

Referring to claim 12, see the rejection of at least claim 4 above.

Referring to claim 18, Ruland further discloses that the image processing system comprises a video surveillance system (col. 1, lines 56-60).

Referring to claim 20, see the rejection of at least claim 1 above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5, 9-13, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney, U.S. Patent No. 5,969,755 ("Courtney") and Ruland, U.S. Patent No. 6,104,831 ("Ruland").

Referring to claim 1, Courtney discloses a method for detecting an object of interest in an image processing system, the method comprising the steps of:

a. generating a difference image (col. 6, lines 22-25)

b. segmenting the difference image into a plurality of regions (col. 6, lines 27-31 and figure 7f)

c. identifying one or more silhouette candidates in at least a subset of the regions (col. 7, lines 52-60 and figure 7f. Note that the "shape mask" in line 59 is interpreted as being analogous to a silhouette candidate)

d. detecting the object of interest based at least in part on the identified silhouettes (col. 7, lines 61-67).

Courtney fails to teach that the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more lines passing through the entire image. However, this feature was exceedingly well known in the art. For example, Ruland discloses a difference image that is segmented into a plurality of regions such that each of the regions are bounded by one or more lines passing through the entire image (col. 2, lines 32-33 and figure 3).

Courtney and Ruland are both concerned with detecting a moving person in an image processing system. Ruland's method detects the presence of a moving object while avoiding erroneous measurements, thereby enhancing the object detection process (Ruland, col. 1, lines 50-54). Therefore, it would have been obvious to modify the segmentation step of Courtney, so that the difference image is segmented into a plurality of regions that are bounded by one or more lines passing through the entire image, as taught by Ruland, in order to localize the region of the image for which further object detection is performed (Courtney, col. 7, lines 52-67), thereby enhancing the object detection process.

Referring to claim 2, Courtney further discloses that the object of interest is a moving person (figure 4).

Referring to claim 3, Courtney further discloses that the difference image comprises a thresholded difference image generated by taking a difference between a first image and a second image and applying binary thresholding to the resulting difference (col. 5, lines 64-67 and col. 6, lines 1-12).

Referring to claim 4, Ruland further discloses that the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more vertical lines passing through the entire image (col. 2, lines 32-33 and figure 3).

Referring to claim 5, Courtney further discloses that the regions of the image which includes a silhouette candidate includes only a single silhouette candidate (figure 7f).

Referring to claim 9, see the rejection of at least claim 1 above. Courtney further discloses a camera (element 11 in figure 1).

Referring to claim 10, see the rejection of at least claim 2 above.

Referring to claim 11, see the rejection of at least claim 3 above.

Referring to claim 12, see the rejection of at least claim 4 above.

Referring to claim 13, see the rejection of at least claim 5 above.

Referring to claim 18, Courtney further discloses that the image processing system comprises a video surveillance system (col. 2, lines 29-34).

Referring to claim 19, Courtney further discloses that the image processing system comprises a human-machine interface (element 28 in figure 5).

Referring to claim 20, see the rejection of at least claim 1 above.

4. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ruland, U.S. Patent No. 6,104,831 ("Ruland") and the article entitled "Grouping .,-,-->,θ, into Regions, Curves, and Junctions" by Lee et al. ("Lee").

Referring to claim 6, Ruland fails to disclose the step of determining saliency values for each of the silhouette candidates using tensor voting.

Lee teaches the determination of saliency values using tensor voting (pages 55-56 under the section labeled "TENSORIAL FRAMEWORK FOR SALIENT STRUCTION INFERENCE").

Lee explains that the saliency values allows for the identification of features such as the edges of an image (Lee, page 54). Therefore, it would have been obvious to determine the saliency values for each of the silhouette candidates of Ruland by the tensor voting method of Lee, since the silhouette candidates are characterized by edge elements (Ruland, col. 2, lines 33-35), and the determination of the saliency values for each of the silhouette candidates would result in the identification of the edge features. Furthermore, one would have been motivated to incorporate the tensor voting method of Lee, since it efficiently collects information in a large neighborhood containing any combination of points, curve elements, or surface patch elements, which would allow for the interpolation, discontinuity detection, and outlier identification of the silhouette candidate simultaneously (Lee, page 54, third paragraph under "INTRODUCTION").

Referring to claim 14, see the rejection of at least claim 6 above.

5. Claims 7, 8, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ruland, U.S. Patent No. 6,104,831 ("Ruland") and Gibbon (E.P. Patent No. 0 635 983 A2).

Referring to claim 7, Ruland fails to disclose the step of detecting a neck position of the moving person. However, this feature was exceedingly well known in the art. For example, Gibbon teaches the step of detecting a neck position of a moving person (figure 10) by analyzing a sum of x-components of tangents along a corresponding silhouette (page 5, lines 29-57. Note

that the neck position is located at a "feature point", which is detected by determining the derivative along the corresponding silhouette (curve), and locating the significant zero crossings. It is further noted that this determination of the zero crossings of the derivative of the silhouette is analogous to analyzing a sum of x-components of tangents along the silhouette, since the tangent of a line is defined by the derivative of the line).

Ruland and Gibbon are both concerned with the detection of a moving object by generating difference images. Gibbon provides an accurate method for determining the position and the size of the moving person's head (Gibbon, page 6, lines 16-17). Therefore, it would have been obvious to detect the neck position of the silhouette of Ruland, by the method taught by Gibbon, in order to enhance the object detection process.

Referring to claim 8, Gibbon further discloses that the detected neck position is utilized to determine the size and position of the moving person's head (page 6, lines 16-17).

Referring to claim 15, see the rejection of at least claim 7 above.

Referring to claim 16, see the rejection of at least claim 8 above.

Referring to claim 17, Ruland fails to explicitly state that the image processing system comprises a video conferencing system. However, Gibbon teaches that the image processing system comprises a video conferencing system (page 3, lines 3-4. Note that "visual communication" in line 4 is interpreted as being analogous to video conferencing).

Therefore, since Ruland and Gibbon are both concerned with detecting a moving object, as disclosed above, it would have been obvious to include the video conferencing system of Gibbon, in the image processing system of Ruland, in order to increase the flexibility of the object detection system.

6. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney (U.S. Patent No. 5,969,755) and Ruland, U.S. Patent No. 6,104,831 ("Ruland"), further in view of the article entitled "Grouping .,-,-->, θ, into Regions, Curves, and Junctions" by Lee et al. ("Lee").

Referring to claim 6, Courtney and Ruland fail to disclose the step of determining saliency values for each of the silhouette candidates using tensor voting.

Lee teaches the determination of saliency values using tensor voting (pages 55-56 under the section labeled "TENSORIAL FRAMEWORK FOR SALIENT STRUCTURE INFERENCE").

Lee explains that the saliency values allows for the identification of features such as points or curve elements (Lee, page 57). Therefore, it would have been obvious to determine the saliency values for each of the silhouette candidates of Courtney and Ruland by the tensor voting method of Lee, since the silhouette candidates are characterized by curve elements (Courtney, col. 7, line 59 and figure 7f), and the determination of the saliency values for each of the silhouette candidates would result in the identification of the curve element features. Furthermore, one would have been motivated to incorporate the tensor voting method of Lee, since it efficiently collects information in a large neighborhood containing any combination of points, curve elements, or surface patch elements, which would allow for the interpolation, discontinuity detection, and outlier identification of the silhouette candidate simultaneously (Lee, page 54, third paragraph under "INTRODUCTION").

Referring to claim 14, see the rejection of at least claim 6 above.

7. Claims 7, 8, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney (U.S. Patent No. 5,969,755) and Ruland, U.S. Patent No. 6,104,831 ("Ruland"), further in view of Gibbon (E.P. Patent No. 0 635 983 A2).

Referring to claim 7, Courtney and Ruland fail to disclose the step of detecting a neck position of the moving person.

Gibbon teaches the step of detecting a neck position of a moving person (figure 10) by analyzing a sum of x-components of tangents along a corresponding silhouette (page 5, lines 29-57. Note that the neck position is located at a "feature point", which is detected by determining the derivative along the corresponding silhouette (curve), and locating the significant zero crossings. It is further noted that this determination of the zero crossings of the derivative of the silhouette is analogous to analyzing a sum of x-components of tangents along the silhouette, since the tangent of a line is defined by the derivative of the line).

Courtney, Ruland, and Gibbon are all concerned with the detection of a moving object by generating difference images. Gibbon provides an accurate method for determining the position and the size of the moving person's head (Gibbon, page 6, lines 16-17). Therefore, it would have been obvious to detect the neck position of the silhouette of Courtney and Ruland, by the method taught by Gibbon, in order to enhance the object detection process.

Referring to claim 8, Gibbon further discloses that the detected neck position is utilized to determine the size and position of the moving person's head (page 6, lines 16-17).

Referring to claim 15, see the rejection of at least claim 7 above.

Referring to claim 16, see the rejection of at least claim 8 above.

Referring to claim 17, Courtney and Ruland fail to explicitly state that the image processing system comprises a video conferencing system. However, Gibbon teaches that the image processing system comprises a video conferencing system (page 3, lines 3-4. Note that "visual communication" in line 4 is interpreted as being analogous to video conferencing).

Therefore, since Courtney, Ruland, and Gibbon are all concerned with detecting a moving object, as disclosed above, it would have been obvious to include the video conferencing system of Gibbon, in the image processing system of Courtney and Ruland, in order to increase the flexibility of the object detection system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
March 9, 2004

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